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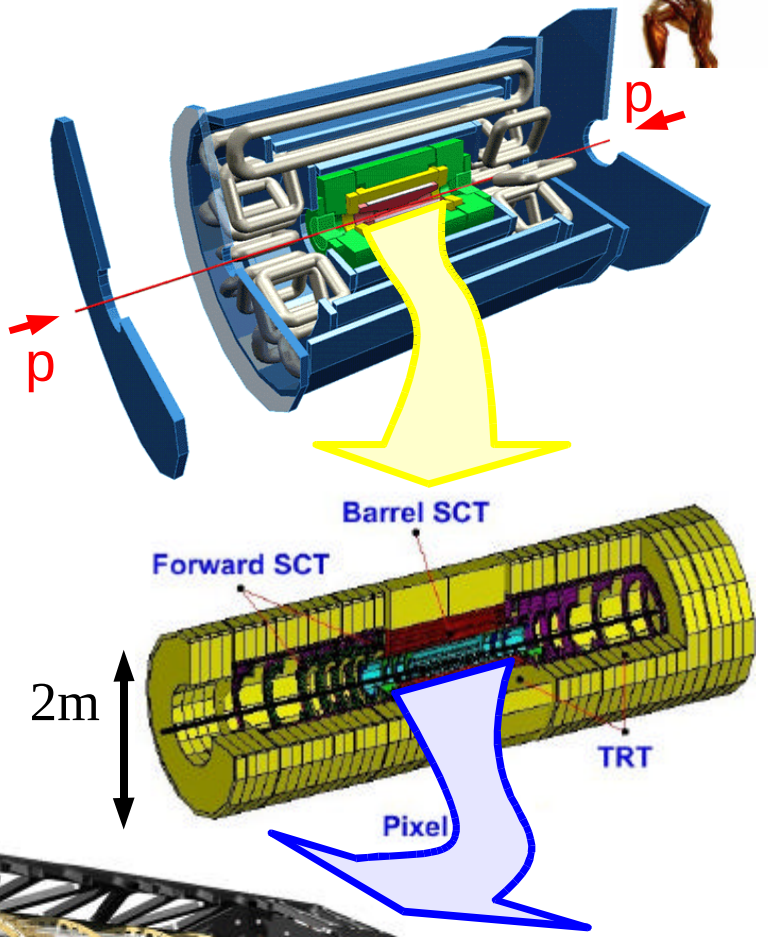
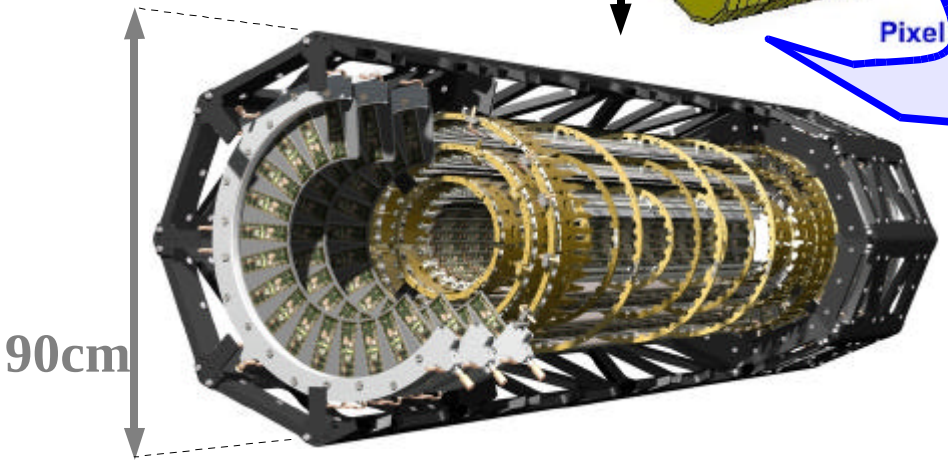
# ATLAS Pixel Detector Test System

## CPPMarseille

# Overview of this talk

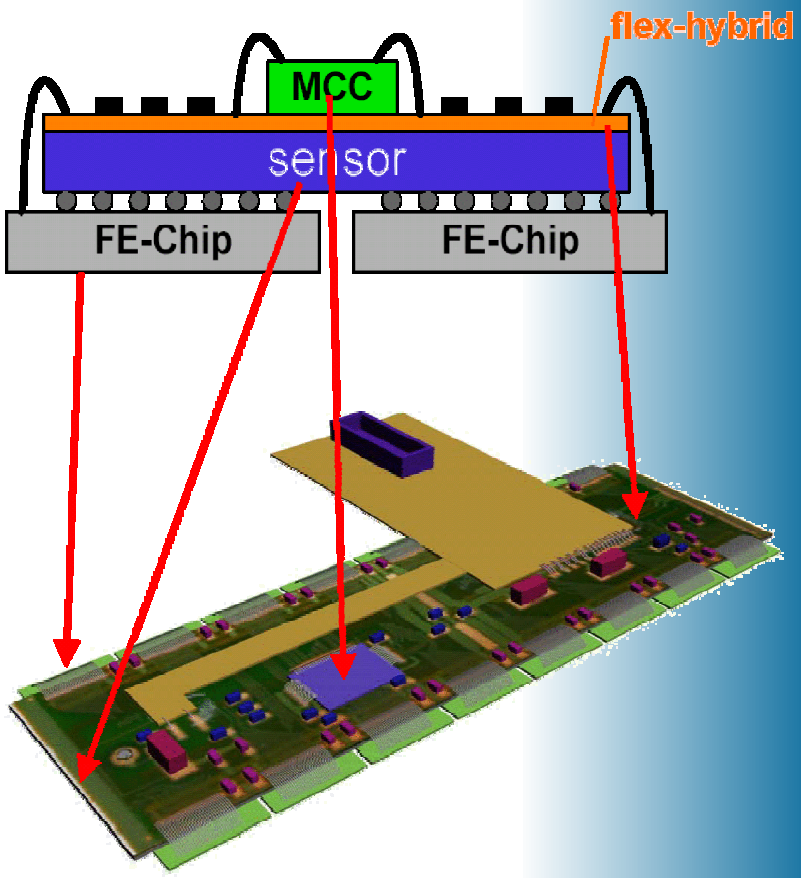
- ATLAS Pixel Detector
- Pixel Detector System Test
- Test System in Marseille
  - Running Condition
  - Cooling System ($C_3F_8$, -25°C)
  - Control and Survey Software
  - Specific Contributions and Setup
- Summary



# Smallest **autonomous** building block:
# **Pixel Module** (1744 in total)

- **16 Frontend-Chips à 160×18 pixels**
  - major heat source, 8W/module
- **1 Module Control Chip**



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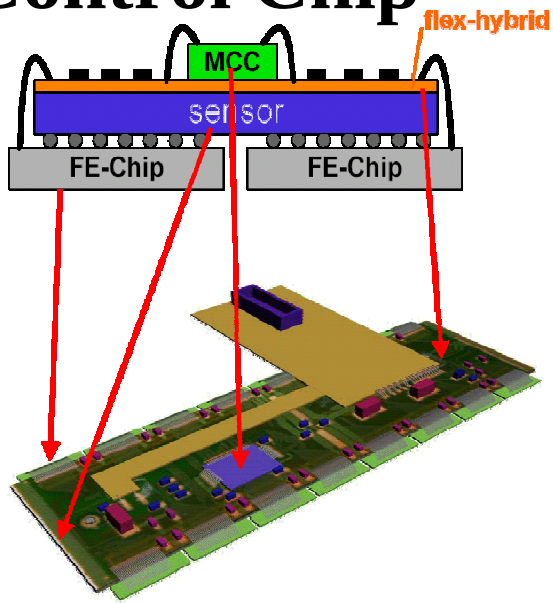
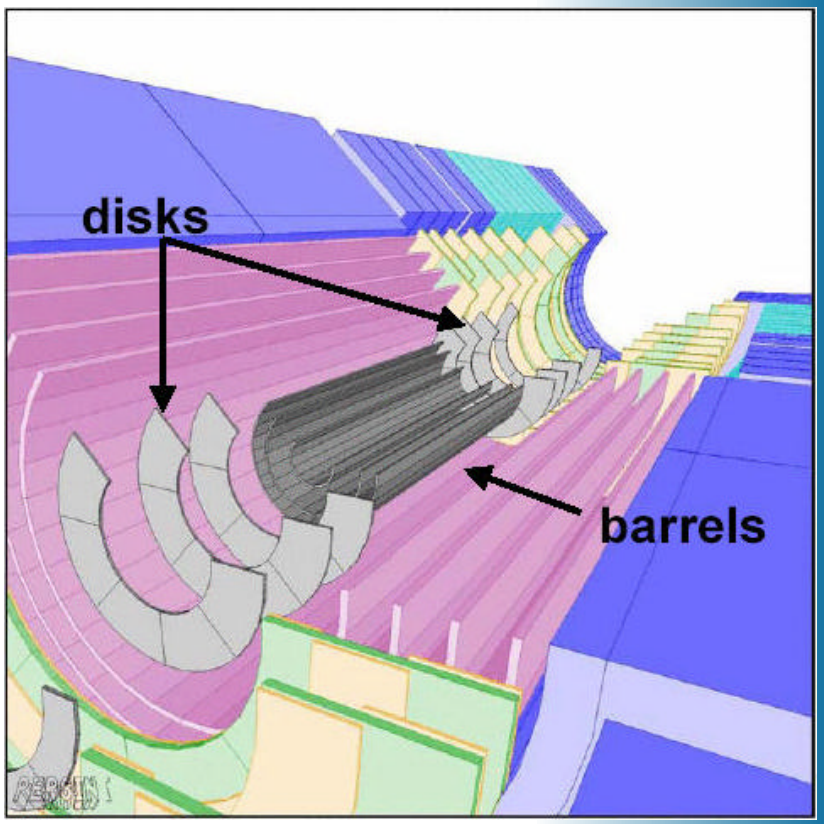



- **mounted on 22+38+52=112 [barrel] staves**

**100W / stave**
(15kW/det.)



# Input/Output
## (Control-Feedback Model)

- **Power Supplies Vdd, Vdda (FEC, MCC)**
  **HV (det.)**
- **Communication DATAin**
- **DATAout**
- **T_NTC**
- **Consumption Idd, Idda, IHV**
-

# System Test

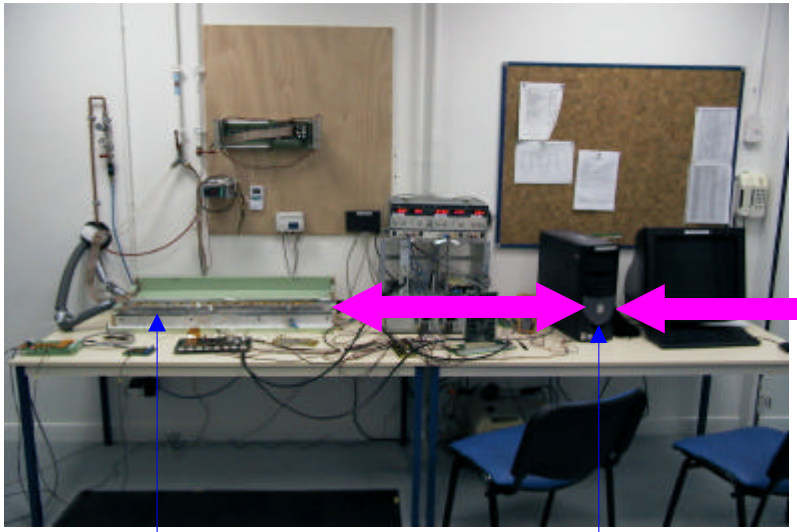
- previous to integration (and production)
- as close as possible to real, final conditions and environment
- « original » interfaces (power supplies, connectivity) or close-to-final prototypes
- permanent, precise control and recording, tracability

# Evaporative $C_3F_8$ / $C_4F_{10}$ Cooling Plant

- Operational and stable since September '04
- Prooved in both ($C_3F_8$, $C_4F_{10}$) modes to fulfil conditions for cooling one completely powered stave around **-30°C or 0°C**
- Safety aspects and auto-pilot:
  - electropneumatic valves
  - Control by ELMB hardware and PVSS software
  - dew point interlock, watchdog
  - SMS server and email
  - automatic power cycling
- **Successful safe and reliable running (9 months)**

# PVSS – SQL interface

## Principle



« *somewhere* »

SQL Database:
grants
- storage (diskspace)
- backup
- retreival

stave

PVSS DB

user 1
JDBC

user 3
SQL+

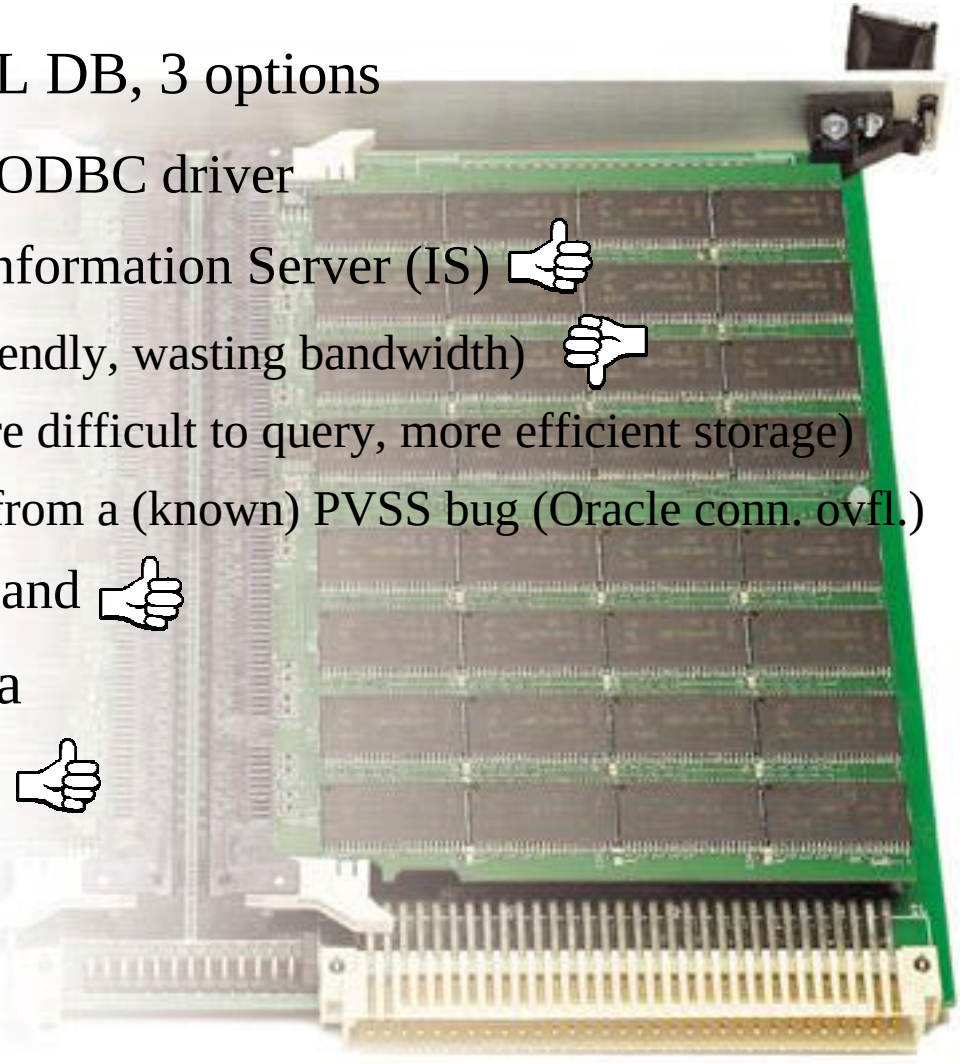
user 2
RootSQL

user 4
Excel/ODBC

# PVSS – SQL interface
## experiences in Marseille

- ASPECT 1  Writing to SQL DB, 3 options
  - write through CTRL and ODBC driver
  - write through ODBC in Information Server (IS)
    - flextables (more user friendly, wasting bandwidth)
    - PVSS-struct tables (more difficult to query, more efficient storage)

  ⚠ Both these options suffer from a (known) PVSS bug (Oracle conn. ovfl.)
  - extract ASCII, insert by hand
- ASPECT 2  Retreiving data
  - JDBC (complete by JAS)
  - RootSQL
  - plain SQL/PL
  - others: perl DBD/DBI, …

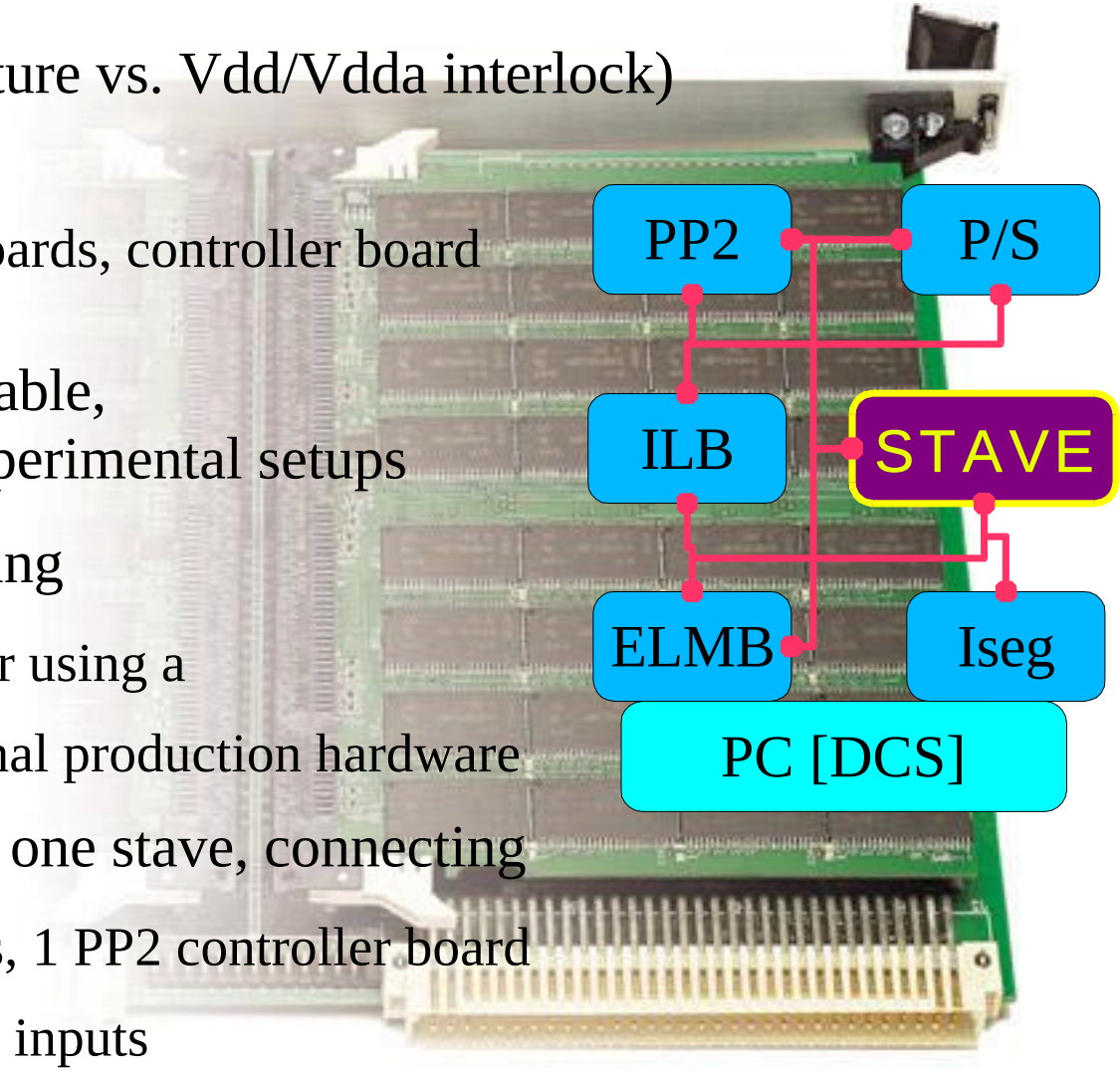


# PP2-ILB backplane (1)

- Safety aspects (temperature vs. Vdd/Vdda interlock)
- Final hardware
  - PP2 crate, regulator boards, controller board
  - ILB board/crate

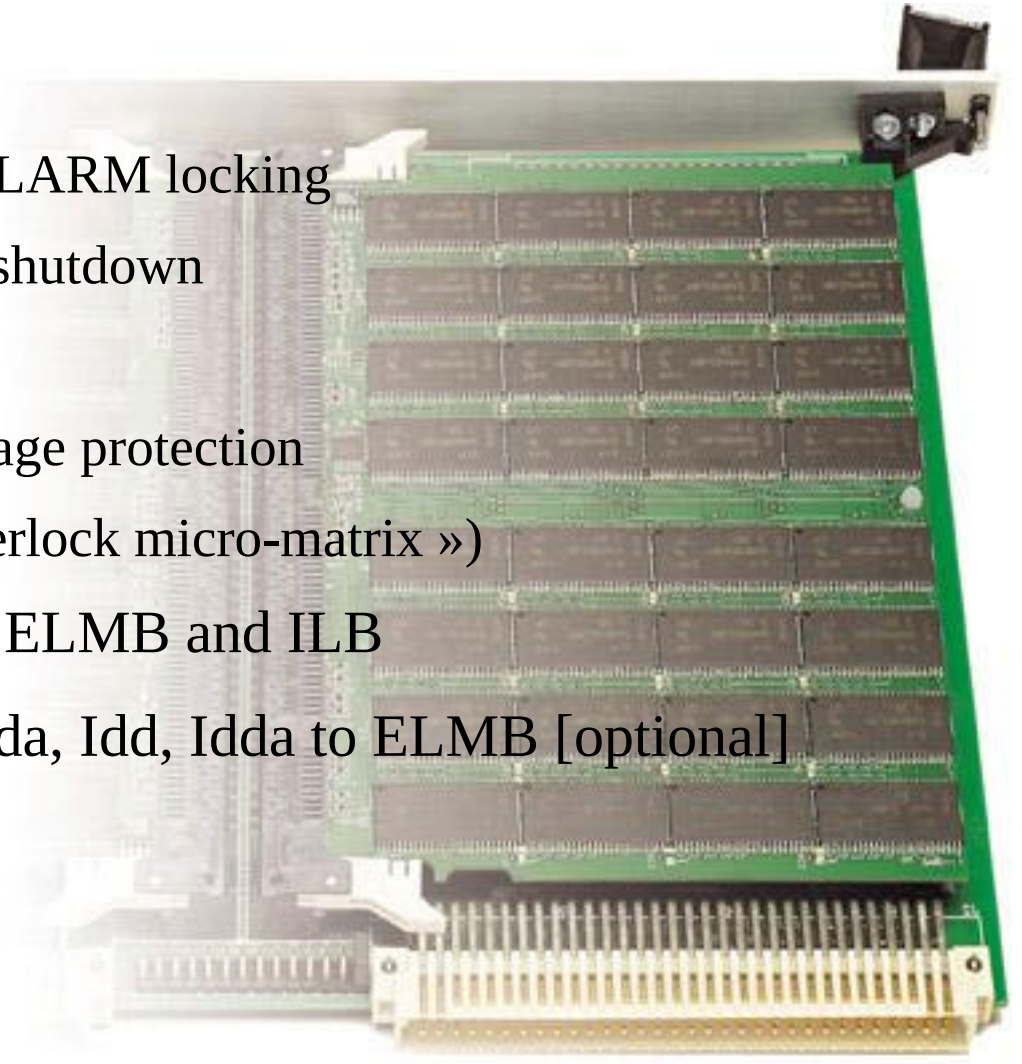
  presently not fully available,
  not compatible with experimental setups
- Auxiliary board, providing
  - minimal framework for using a
  - maximal number of final production hardware

  in a testbench setup for one stave, connecting
  - 2 PP2 regulator boards, 1 PP2 controller board
  - ELMB ADC and NTC inputs
  - Interlock "Box" (ILB)



# PP2-ILB backplane (2)

- Further functions
  - PVSS watchdog and ALARM locking
  - Cooling system safety shutdown
  - PP2 power-on-reset
  - PP2 regulator-overvoltage protection
  - KILL-OR logics (« Interlock micro-matrix »)
- Connections of NTCs to ELMB and ILB
- Connections of Vdd, Vdda, Idd, Idda to ELMB [optional]



# Summary: Marseille SysTst

- **« Official » / common hardware complete and OK.**
- DAQ/DCS software under development, but not blocking
- Auxiliary electronics (safety, interlock) designed
- Cooling system h/w and control s/w need update to run
  - safely and in
  - autopilot mode
- DAQ software closeup when local projects ready
- **Spinoff / option: Production Tests???**
  - gain fZ4 for 20h run } 5h (1/day, invariant!)
  - earliest available: when all above conditions fulfilled
- **Conclusion: Go for test run now, decide on options later**